PARTICLE PHYSICS DIVISION OPERATING MANUAL
REVIEW AND APPROVAL RECORD

ES&H REVIEW OF EXPERIMENTS

Approved by _____ Date 12/26/2003
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This Procedure has been approved by the above people on the above date and has been e-mailed to all PPD Department Heads.

Astrophysics
CDF Department
CDF Project
CMS Project
Directorate
DZero Project
Electrical Engineering
Environment, Safety, & Health
Experimental Physics Project
Mechanical Department
NuMI Project
Particle Physics Office
Site Department
Support Services
Technical Centers
Theoretical Physics

ES&H REVIEW OF EXPERIMENTS

INTRODUCTION

Experiments in the Particle Physics Division (PPD) require ES&H review to help ensure that all appropriate standards and requirements are met. These reviews, because of specificity or complexity, are outside of the normal purview of the established Laboratory Safety Committee (LSC) Subcommittees. Consequently, ES&H Review Panels for experiments have been established. This document defines the procedures for these panels. Operation of experiments depends on satsifactory reviews and is controlled for specific parts of an apparatus by partial Operational Readiness Clearance. Final operational authority is granted by an Operational Readiness Clearance signed by both the head of the PPD and the head of the Beams Division.

CDF and DZero have specific Safety Assessment Documents (SAD). Fixed-target experiments are covered by a single SAD.

RESPONSIBILITIES

The **Particle Physics Division Head** or designee, develops the charge to the panel; establishes the level of review needed; and names panel members in consultation with Division/Section Heads, Department Heads, and LSC Subcommittee Chairs, as appropriate.

The **ES&H Review Panel** is normally charged to complete a timely and accurate safety review and provide a written report describing its conclusions to one or more of the following: the Division Head, the Project Engineer, the Chairperson of the appropriate LSC subcommittee, and the experiment spokesperson.

The **ES&H Review Coordinators** are members of PPD and are appointed to work with individual experiments. They are assigned by the PPD Head. To accomplish their assignments, the ES&H Review Coordinators are expected to work with the PPD Head, the experiment spokesperson, the Project Engineer, and the liaison physicist as appropriate. Their primary responsibility is to assist and guide the experimenters to the completion of the Operational Readiness Clearance (ORC). This includes working with the experimenters to determine the elements of the experiment that require special review, and to set-up the appropriate review committees to accomplish this review. ES&H Review Coordinators are also to assist with the preparation of Preliminary SAD's or SAD's if they are required. Co-ordinators for active PPD Review Panels are listed on the PPD Organization Chart.

ES&H REVIEW CRITERIA FOR EXPERIMENTS

1. All experiments having significant (complex or hazardous) systems or operations shall be subjected to a safety analysis and review by a ES&H Review Panel.
   a. The analysis and review will look at all aspects of the system which could present a hazard to personnel or equipment.
   b. The analysis shall demonstrate that the system is designed and constructed in accordance with applicable codes and standards.
   c. The relevant analysis and review shall be completed before initial operation of any part of the system.
2. The panel will be available for the life of the experiment to review new additions to the experiment. All new proposals, including significant modifications to existing equipment, must be reviewed and approved for operation through the ORC process.

GUIDELINES FOR ESTABLISHING A SAFETY REVIEW

The following items require an ES&H review. This is not a complete list. Reviews shall be required whenever the Division Head, Project Engineer, system designer or other knowledgeable person so determines. **Note**: All systems must meet all Fermilab safety standards.

Computers or Programmable Logic Controller (PLC) Use: Detector or apparatus control systems that rely solely on dedicated computers or PLC's for safety, environment, or property protection functions must comply with Director's Policy #21.

Cryogenic Hazards: Cryogenic systems for magnets, hydrogen targets, calorimeters, or any cryogenic system with inventory exceeding 200 liters.

Electrical Hazards: Electrical systems which meet any of the following criteria:

- Uses non-commercial or modified commercial equipment.
- Uses non-PREP or modified PREP equipment.
- Any non-commercial low voltage high current or high voltage distribution systems.
- Any equipment with large capacitor banks.

Fire Hazards: Any large combustible items such as large quantities of plastic scintillator, large numbers of cables requiring cable trays

Flammable Gas Systems: Any use of flammable gas and flammable gas mixtures.

Laser Hazards: Lasers of class III B or higher.

Mechanical Hazards: Devices which meet any of the following criteria:

- Weighs over 3 tons and is supported above the floor
- Exceeds 10 tons in total weight
- Moves at a speed greater than 5 ft/sec
- Costs more than $100,000 to replace
- Includes pressure/vacuum vessels

Oxygen Deficiency Hazards: Use of any oxygen displacing gases such as chamber gas systems, helium bag systems, dry nitrogen, cryogenic magnets, or targets

Pressure and Vacuum Vessels and Systems : All pressure and vacuum vessels require an engineering review.

Radiation Hazards: Radioactive sources/materials which will be used. Specify if embedded in detectors.

Toxic Materials and Environmental Hazards: Toxic/hazardous materials planned or used, if the amount exceeds few gallon/pound quantities. Examples include: lithium, beryllium, mercury, lead, uranium, cyanide, PCB's, freons, oils.

OPERATIONAL APPROVALS

Prior to operating equipment or performing work on experimental apparatus in PPD spaces, the assigned ES&H Review Panel will review and inspect the equipment. All partial Operational Readiness Clearance forms must be completed and approved by the Review Committee Co-ordinator, the PPD Senior Safety Officer, and finally, the PPD Head. Other signatures may be required depending on the scope and location of the work. Examples of additional signatures are the Fixed Target Run Co-ordinator for Fixed Target experiments, the Beams Division (BD) Operations Department Head for experiments that require Main Control Room support, other Division/Section Heads when work is being performed in their areas or affect their workers, and other D/S Senior Safety Officers when work is being performed in their areas or affect their workers.

The experiment spokesperson is required to assure the PPD Head in writing that the hazards in the experiment have been identified to all its participants and that all participants have received appropriate training and instruction. This is required before the ORC will be signed.

The Beams Division Head and the Particle Physics Division Head are both required to sign the Operational Readiness Clearance form before an experiment is allowed to receive beam. This is a positive means to ensure that both divisions are aware of operating conditions and parameters for each experiment and have agreed that the appropriate procedures, safety equipment, and run conditions are in place and functional before the start of the experiment.